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ORIGINAL ARTICLE

Syphilis Seropositivity in Blood Donors: A study at Multan

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ABSTRACT

Aim: To determine syphilis seropositivity in healthy blood donors.
Study design: Cross sectional analytical study
Place and duration of study: Conducted atNishtar Medical Universityfrom February 2022 to July 2022.
Methodology: Healthy blood donors of either gender between 18-50 years of age were included in study. All individuals were screened for transfusion transmissible infections including Syphilis. Data was collected by using preformed questionnaire that included information regardingsocio-demographic profile. The data was entered and analyzed by SPSS version 22.0.
Results: Mean age of donors was 26.48±6.25 years. The highest proportion of donors was between 18-29 years age (69.2%). Majority (99.2%) blood donors were male. The marital status of the blood donors showed that 595 (81.9%) were single. The educational level of the participants revealed that about two third 465 (64.1%) blood donors had up to matric education and majority of blood donors 493 (67.9%) were resident of urban areas. The seropositivity of syphilis among donors was02.5%. The seropositivity of the syphilis is significantly associated with age (p<0.001), gender (p=0.001), educational level (p=0.001) and residence (p=0.05) of donors.
Conclusion: Blood supply safety is dependent on screening of blood donors for transfusion transmissible infections. Therefore it must be compulsory to screen apparently healthy blood donors for syphilis.
Keywords: Transfusion, Infection, Blood bank, Blood donors

INTRODUCTION

Donation of blood is solidarity action which is essential for saving lives sometimes. It is of critical importance for female suffering from obstetric complications, children with severe anemia, seriously injured patients due to accidents and in patients undergoing through complex surgeries[1,2].

Regular blood donation by healthy individuals ensures the availability of blood in blood banks during an emergency situations in which urgent transfusion of blood is essential to save life. In an healthy donor is usually restored with eight to twelve weeks that's why it is recommended that blood can be donated after every two to three months[3,4,5]. Blood donation rate indicates the general availability of the blood in the country. Globally about 118.54 million blood donations are collected and forty percent of these donations are from developed nations. In low and high income countries there is remarkable difference in blood donation rate. In developing countries blood donation rate is 31.5 donations per 1000 population while this rate is only 6.6 donations per 1000 population in developing nations[6,7,8].

Blood transfusion although is therapeutic intervention that is used in numerous specialties like obstetrics, pediatrics, surgery and traumatology, it is also associated with the threat of transmitting the infections like hepatitis B, C, Malaria, HIV and syphilis which may become potential public health problem if not prevented[9,10]. These transfusion transmissible infection not only threat for the blood recipients but also for the families and community[11].

Syphilis is caused by the bacterium *Treponemapallidum* which may damage every tissue and organ in the body including the heart, bones, and digestive tract.It can also affect hearingand vision. The most dangerous form of syphilis is neurosyphilis that may suddenly cause blindness, paralysis and even death if remain undiagnosed and untreated[12].

This study has been conducted to assess the burden of syphilis seropositivity among healthy blood donors which in turn will help to ensure the safety of collected blood and recipients of blood.

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MATERIALS & METHODS

This was a hospital-based, cross sectional analytical study conducted in Nishtar Medical University from February 2022 to July 2022. The data wascollected from the blood bank of Nishtar Hospital Multan after approval of the ethics review committee of the Institute. The sample size calculated for the study at 95% level of confidence, 1% margin of error and 2% anticipated population proportion (Sero-positivity of syphilis in blood donors)[13] was 726. Healthy blood donors of either gender between 18-50 years of age with weight more than 55 kilograms and hemoglobin level of ≥14.0gm/dl and ≥12.0gm/dlfor male and females respectively and had donated blood minimum three months back were included in the study by non-probability consecutive sampling method. All the individuals included in the study were screened for Hepatitis B virus (HBV), Hepatitis C virus (HCV), Human immune deficiency virus (HIV), Malaria parasite (MP) and Syphilis as per protocol of the blood bank. Health history was obtained from all the study subjects and consent for blood donation was taken before screening. This questionnaire included information regarding sociodemographic profile like age, gender, marital status, residence and education. Standard procedures of blood collection and storage were followed. The samples collected were screened for the detection of syphilis. The collected data was entered and analyzed by using SPSS version 22.0. Stratification was done according to sociodemographic characteristics of the donors and their seropositivity status. Post stratification Chi Square/Ficher Exact test was applied to see any significant difference between groups and p value equal to or less than 0.05 was taken as significant.

RESULTS

Total 726 blood donors fulfilling the inclusion criteria were enrolled in the study having mean age of 26.48±6.25 years. The age distribution of the respondents (n=726) showed that the highest proportion of donors was between the ages of 18-29 years 502(69.2%), followed by 30-39 years 203(28.0%) and ≥40 years 21(2.8%).The gender distribution of the blood donors showed that

669 (99.2%) blood donors in the study were male and only 57 (7.8%) were females. The marital status of the study participants showed that majority of the blood donors 595(81.9%) were single. The educational level of the study subjects revealed that about two third 465(64.1%) blood donors had up to matric education and majority of the blood donors 493(67.9%) were resident of urban areas (Table I).

The serospositivity findings of syphilis among the donors showed that 18(02.5%) of the subjects had positive screening test for the syphilis (Table II).The cross tabulation of sociodemographic characteristic of the blood donors with seropositivity of the syphilis showed that age (p<0.001), gender (p=0.001), educational level (p=0.001) and residence (p=0.05) were significantly associated with the syphilis seropositivity while gender (p=.64)was not found to be significantly associated with syphilis seropositivity (Table III).

Table I: Sociodemographic characteristics of blood donors (n=726)

Age (years)	**Frequency**	**Percentage**
19-29	502	69.2%
30-39	203	28.0%
≥40	21	02.8%
Total	726	100%
Gender		
Male	669	92.2%
Female	57	07.8%
Total	726	100%
Marital Status		
Single	595	81.9%
Married	131	18.1%
Total	726	100%
Education		
Illiterate	138	19.0%
Upto matric	465	64.1%
Graduation & postgraduate	123	16.9%
Total	726	100%
Residence		
Urban	493	67.9%
Rural/Slum areas	233	32.1%
Total	726	100%

Table II: Seropositivity of syphilis among blood donors (n=726)

Seropositivity	**Frequency**	**Percentage**
Yes	18	2.5%
No	708	97.5%
Total	71	100%

Table III: Sociodemographic characteristics &Seropositivity of syphilis among blood donors (n=726)

Age (years)	**Syphilis Seropositivity**		**p-value**
	Yes	**No**	
19-29	08 (44.4%)	494 (69.8%)	<0.001
30-39	06 (33.3%)	197 (27.8%)	
≥40	04 (22.3%)	017 (02.4%)	
Total	18 (100%)	708 (100%)	
Gender			
Male	13 (72.2%)	656 (92.6%)	0.001
Female	05 (27.8%)	052 (07.4%)	
Total	18 (100%)	708 (100%)	
Marital Status			
Single	14 (77.8%)	581 (82.1%)	0.64
Married	04 (22.2%)	127 (17.9%)	
Total	18 (100%)	708 (100%)	
Education			
Illiterate	09 (50.0%)	129 (18.2%)	0.001
Upto matric	05 (27.8%)	460 (64.9%)	
Graduation & postgraduation	04 (22.2%)	119 (16.9%)	
Total	18 (100%)	708 (100%)	
Residence			
Urban	16 (88.9%)	477 (67.4%)	0.05
Rural/Slum areas	02 (11.1%)	231 (32.6%)	
Total	18 (100%)	708 (100%)	

DISCUSSION

Blood transfusion is a life-saving intervention in modern medicine. Screening for the infections that are transmitted through blood transfusion is necessary to ensure the safety of recipients.

A total of 726 blood donors fulfilling the inclusion criteria were included in the study. The mean age of the healthy blood donors was 26.486.25 years. The age distribution of the respondents showed that more than two-thirds of the healthy blood donors (69.2%) were between 19 and 29 years old. The gender distribution of the blood donors revealed that more than 90% (92.2%) of the blood donors in the study were male. These findings are in line with the study conducted by Shengha N et al., in which major proportions of the blood donors were under the age of thirty years and the majority of blood donations were from the male population. 14 The marital status of the study participants indicated that the majority of the blood donors (81.9%) were single. The educational level of the study subjects indicated that about two-thirds (64.1%) of the blood donors had up to matriculated education, and the majority of the 493 blood donors (67.9%) were residents of urban areas. These findings of sociodemographic variables are consistent with the results of a study conducted by Arshad A et al., in which a higher proportion of unmarried people donated blood and the educational level of the donors was low[8]. The higher proportion of blood donors from urban areas may be due to the fact that the sample was taken from the blood bank of a tertiary care hospital that is located in a metropolitan area and that the majority of the admitted patients in the hospital are from urban areas. The rural population is usually treated at the primary and secondary healthcare levels, and blood banks are also now available at tehsil and district headquarter hospitals[15].

The seroprevalence of syphilis among the donors was 0.25%. The findings of earlier studies conducted to determine the syphilis positivity rate in healthy blood donors in Pakistan showed variation in rates ranging from 3.1%, 16.5%, 17.5% and 2.1% to 0.91%. The study findings revealed that syphilis seropositivity is significantly associated with the blood donors' age (p 0.001), gender (p = 0.001), educational level (p = 0.001), and residence status (p = 0.05).The gender (p=.64) of the participants was not found to be significantly associated with syphilis seropositivity.

Syphilis screening for all blood donors is required in Pakistan as per the blood safety legislation.20 It is past time to collect data on the syphilis epidemiology of the nation's blood donor population. The use of behavioural screening questionnaires to exclude donors at higher risk of infection and testing the blood with highly sensitive and specific laboratory procedures are mandatory to reduce the risk of syphilis transmission.

CONCLUSION

We concluded from this study that the seropositivity of syphilis among donors was 02.5%. The safety of the blood supply is dependent on screening blood donors for transfusion transmissible infections. As a result, it should be mandatory to screen seemingly healthy blood donors for syphilis.

Conflict of interest: Nil

REFERENCES

1. Yildiz SM, Candevir A, Kibar F, Karaboga G, Turhan FT, Kis C, et al. Hepatitis B, Hepatitis C, Human immunodeficiency virus and syphilis frequency among blood donors: A single center study. Transfusion and Apheresis Science. 2015 Dec 1;53(3):308-14.
2. Attie A, de Almeida-Neto C, S Witkin S, Derriga J, Nishiya AS, Ferreira JE, Costa ND, AlvesSalles N, Facincani T, Levi JE, Sabino EC. Detection and analysis of blood donors seropositive for syphilis. Transfusion Medicine. 2021 Apr;31(2):121-8.

3. Kluppel GP, de Oliveira JB, Skare TL, Favero KB, Almeida PT, Nisihara RM. Seropositivity for syphilis among Brazilian blood donors. A retrospective study 2015–2020. Transfusion and Apheresis Science. 2022 Feb 1;61(1):103286.
4. Quintas E, Cogle AD, Dias CC, Sebastiao A, Pereira AD, Sarmento A, Cordeiro L. Prevalence of Syphilis in Blood Donors in Angola from 2011 to 2016. Clinical and Medical Reports. 2018 Jan 1;1(4).
5. Kaur G, Kaur P. Syphilis testing in blood donors: an update. Blood Transfusion. 2015 Apr;13(2):197.
6. Deressa T, Birhan W, Enawgaw B, Abebe M, Baynes HW, Desta M, Terefe B, Melku M. Proportion and predictors of transfusion-transmissible infections among blood donors in North Shewa Zone, Central North Ethiopia. PloS one. 2018 Mar 26;13(3):e0194083.
7. Wu X, Guan Y, Ye J, Fu H, Zhang C, Lan L, Wu F, Tang F, Wang F, Cai Y, Yu W. Association between syphilis seroprevalence and age among blood donors in Southern China: an observational study from 2014 to 2017. BMJ open. 2019 Nov 1;9(11):e024393.
8. Arshad A, Borhany M, Anwar N, Naseer I, Ansari R, Boota S, Fatima N, Zaidi M, Shamsi T. Prevalence of transfusion transmissible infections in blood donors of Pakistan. BMC hematology. 2016 Dec;16(1):1-6.
9. Rauf R, Cheema A. Potential risk of transfusion-transmissible infections among blood donors in district Faisalabad of Pakistan. Clinical Medicine. 2019 Jun 1;19(Suppl 3):s27-.
10. Emadi B, Rezaieh MG, Sedighi M. Seroprevalence and trends of transfusion transmissible infections among retrospective blood donors in Western Azerbaijan Regional Blood Transfusion Center, Iran: A ten-years evaluation. Transfusion and Apheresis Science. 2021 Jun 1;60(3):103132.
11. Zameer M, Shahzad F, Khan FS, Ali H, Saeed U, Farooq M. transfusion transmissible infections among healthy blood donors at blood bank from Children's Hospital & Institute Of Child Health Lahore. Pakistan Armed Forces Medical Journal. 2017 Feb 1;67(1).
12. Amin HI, Jafar HS, Sadiq FA, Bhatti S, Ahmad N, Gul S, Lodhi Y. Prevalence of syphilis among the healthy blood donors-A hospital based retrospective study. Pjmhs. 2019;13(3):647-50.
13. Waheed U, e Saba N, Wazeer A, Arshad M, Zaheer HA. Epidemiology of syphilis in blood donors in Pakistan. Global Journal of Transfusion Medicine. 2020 Jan 1;5(1):100.
14. Shenga N, Thankappan KR, Kartha CC, Pal R. Analyzing sociodemographic factors amongst blood donors. Journal of Emergencies, Trauma and Shock. 2010 Jan;3(1):21.
15. Bibi S, Siddiqui T, Jafry S, Ahmed W. Infection control practices in blood banks of Pakistan. Eastern Mediterranean Health Journal. 2019;25(5):331-40.
16. Nazir S, Pracha HS, Khan A, Nazar A, Fayyaz A, Khan MS, *et al*. Prevalence of syphilis in Pakistani blood donors. Adv Life Sci 2013;1:27-30.
17. Saeed M, Hussain S, Rasheed F, Ahmad M, Arif M, Hamid Rahmani MT. Silent killers: Transfusion transmissible infections-TTI, among asymptomatic population of Pakistan. J Pak Med Assoc 2017;67:369-74.
18. Arshad A, Borhany M, Anwar N, Naseer I, Ansari R, Boota S, *et al*. Prevalence of transfusion transmissible infections in blood donors of Pakistan. BMC Hematol 2016;16:27.
19. Sultan S, Murad S, Irfan SM, Biag MA. Trends of venereal infections among healthy blood donors at Karachi. Arch Iran Med 2016;19:192-6.
20. Safe Blood Transfusion Programme, Pakistan. National Blood Policy and Strategic Framework 2014-20. Available from: http://sbtp.gov.pk/wp- content/uploads/2019/06/nbp-nsf-2014-20-final-2.pdf. [Last accessed on 2022 Sept 02].